Complete Summary

GUIDELINE TITLE

Practice management guidelines for nutritional support of the trauma patient.

BIBLIOGRAPHIC SOURCE(S)

EAST Practice Management Guidelines Work Group. Practice management guidelines for nutritional support of the trauma patient. Allentown (PA): Eastern Association for the Surgery of Trauma (EAST); 2001. 112 p. [93 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Multisystem injuries, including severe head injuries, burns, and blunt and penetrating torso and abdominal trauma

GUIDELINE CATEGORY

Management

CLINICAL SPECIALTY

Emergency Medicine
Gastroenterology
Internal Medicine
Nutrition
Plastic Surgery
Surgery

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

Route of Nutritional Support

- To determine the benefits and risks of the route of nutrition in the severely injured patient through peer reviewed publications over the past 20 years
- To develop recommendations and guidelines from the conclusions of these studies based on the scientific methodology of these studies

Early Versus Delayed Enteral Feedings

- To summarize published data describing the success and limitation of nutrition support in diverse populations of trauma patients

Standard Versus Enhanced Nutrition Support

- To examine if there is a clinical benefit to the use of enhanced formulations of enteral and parenteral nutrition support products in trauma patients

Site of Enteral Support: Gastric Versus Jejunal

- To examine the clinical outcomes of trauma patients fed enterally via the gastric or jejunal route

Assessment of Energy and Substrate Requirements for the Trauma Patient

- To examine the various methods used to determine adequate caloric and substrate requirements in trauma patients

Nutrition Monitoring

- To examine the type and frequency of monitoring of patients receiving nutritional support in order to improve the efficacy of the nutritional intervention and prevent complications

TARGET POPULATION

Patients with multisystem injuries, including severe head injuries, burns, and blunt and penetrating torso and abdominal trauma

INTERVENTIONS AND PRACTICES CONSIDERED

Route of Nutritional Support

1. Enteral feedings
2. Parenteral feedings
3. Total parenteral nutrition (TPN)
4. Total enteral nutrition (TEN)

Early Versus Delayed Enteral Feedings

1. Early intragastric feedings (within 12 hours of burns) in burn patients
2. Post-pyloric feedings (beyond Ligament of Treitz) in patients with severe head injury who do not tolerate gastric feeding
3. Direct small bowel feedings via nasojejunal feeding tubes, gastrojejunal tube or feeding jejunostomy (needle catheter jejunostomy) within 12-24 hours of injury in patients with blunt and penetrating abdominal injuries

Standard Versus Enhanced Nutrition Support

1. Standard nutritional support
2. Enhanced nutritional support (addition of omega-3 fatty acids, nucleotides, arginine, beta-carotene, and/or glutamine)
3. Laboratory evaluation of trace element levels and replacement as needed

Site of Enteral Support: Gastric Versus Jejunal

1. Early gastric feeding
2. Percutaneous gastrostomy (PEG)
3. Enteral feedings into the jejunum via naso-jejunal feeding or percutaneous gastrojejunostomy (PEGJ)

Assessment of Energy and Substrate Requirements for the Trauma Patient

1. Use of indirect calorimetry to determine caloric requirements and calculation of resting energy expenditure (REE) using the Weir equation
2. Calculation of basal energy expenditure (BEE) using the Harris-Benedict equation
3. Calculation of measured resting energy expenditure (MREE)
4. Use of the Curreri Formula to estimate caloric needs
5. Ongoing assessment of appropriateness of nutritional support to avoid under- and over-feeding

Nutrition Monitoring

1. Baseline measurement and ongoing monitoring of the following laboratory values: serum pre-albumin, albumin, total protein blood urea nitrogen (BUN), creatinine, plasma electrolytes, glucose, calcium, magnesium, inorganic phosphorus, total protein, hemoglobin, white blood cell count (WBC), platelet count, triglycerides, transaminases
2. Regular weighing and measurements of intravenous volume infused, oral intake, and urinary output
3. Assessments of overall caloric and protein requirement: Harris-Benedict Equation (HBE), indirect calorimetry, nitrogen balance calculation, and the creatinine-height index (CHI)

MAJOR OUTCOMES CONSIDERED

- Incidence of septic complications

- Other complications, including multisystem organ dysfunction
- Length of hospital stay
- Mortality rates
- Total caloric intake and caloric balance
- Nitrogen balance
- Utility and efficacy of nutritional monitoring

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Route of Nutritional Support

References were identified using the computerized searches of the National Library of Medicine (NLM) using the National Library of Medicine´s search service to access Medline.

The search was designed to identify English language citations between 1976 and 2000 using the keywords: nutrition, enteral, parenteral, trauma, injury, and burn. The bibliographies of the selected references were examined to identify relevant articles not identified by the computerized service.

Ninety-five articles were identified. Literature reviews, case reports, and editorials were excluded. A cohort of three trauma surgeons selected twenty-seven articles for review and analysis.

Early Versus Delayed Enteral Feedings

A computerized search of the National Library of Medicine was undertaken using "Key Server" software to identify English language citations during the period 1983 through 2000. In addition bibliographies from these articles were used to search additional relevant papers. Only articles which attempted to use specialized nutrition support as early as possible following injury were studied and the data analyzed for clinical success with the therapies.

Standard Versus Enhanced Nutritional Support

Medline search 1980-2000. Citations to include "enhanced nutrition", "nutrition support", "trauma", "burn", "enteral", "parenteral", "burn", and "micronutrients" were used.

Editorials and case reports were deleted. The list was culled to a total of 23 articles.

Site of Enteral Support: Gastric Versus Jejunal

A Medline search was conducted for all articles published between 1973 through December 2000, using the key words "gastrostomy" and "jejunostomy". Another Medline search was conducted using the key words "enteral nutrition" and "trauma". Articles describing techniques, review articles, and case reports were excluded, although their references were reviewed to identify pertinent articles not found in the Medline search.

Assessment of Energy and Substrate Requirements for the Trauma Patient

A Medline search was conducted to identify all English language citations from 1973 through 1998 that contained one or more of the following keywords: "nutritional support", "trauma", "critically injured", "head injury", "spinal cord injury", "paraplegia", "quadriplegia", "burns", "energy expenditure", "energy intake", "enteral", "parenteral", "dietary proteins", "dietary fats", "dietary carbohydrates", "protein", "carbohydrate", "fat", "lipid", "requirements", and "nutrition". Bibliographies of selected references and standard textbooks or other educational material were also examined to identify articles that might not have been retrieved in the computerized searches. Studies involving laboratory animals were excluded from our review, as were studies where the patient population was exclusively or predominantly pediatric so as to avoid the effect of growth and maturation of the patient upon energy and substrate requirements. Also excluded were letters to the editor, isolated case reports and most collected reviews. This resulted in a total of 93 articles.

Nutrition Monitoring

A MEDLINE search was done from 1974 to present using the following terms: nutrition, monitoring, enteral nutrition, parenteral nutrition, albumin nitrogen balance, indirect calorimetry, trauma, critically ill and electrolytes. Only English language literature was reviewed. A total of 211 references were cited. Of these only 34 references were found to be directly relevant to the topic of nutrition monitoring. In addition literature was reviewed from non-MEDLINE sources. Several textbooks and other reports were reviewed. Six hospitals were polled to determine their protocols for monitoring of nutrition support.

NUMBER OF SOURCE DOCUMENTS

Route of Nutritional Support

28 articles

Early Versus Delayed Feedings

Not stated

Standard Versus Enhanced Nutritional Support

23 articles

Site of Enteral Support: Gastric Versus Jejunal

Not stated

Assessment of Energy and Substrate Requirements for the Trauma Patient

93 articles

Nutrition Monitoring

More than 34 articles

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Evidence Classification Scheme:

Class I: Prospective randomized studies

Class II: Prospective, non-comparative studies; retrospective series with controls

Class III: Retrospective analyses (case series, databases or registries, case reviews)

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Level I: The recommendation is convincingly justifiable based on the available scientific information alone. This recommendation is usually based on Class I data, however, strong Class II evidence may form the basis for a Level I recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low quality or contradictory Class I data may not be able to support a Level I recommendation.

Level II: The recommendation is reasonably justifiable by available scientific evidence and strongly supported by expert opinion. This recommendation is usually supported by Class II data or a preponderance of Class III evidence.

Level III: The recommendation is supported by available data but adequate scientific evidence is lacking. This recommendation is generally supported by Class III data. This type of recommendation is useful for educational purposes and in guiding future clinical research.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The draft document is submitted to all members of the panel for review and modification. Subsequently the guidelines are forwarded to the chairmen of the Eastern Association of Trauma ad hoc committee for guideline development. Final modifications are made and the document is forwarded back to the individual panel chairpersons.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Level of recommendations (I-III) and the class of data grading (I-III) are defined at the end of the "Major Recommendations" field.

Route of Nutritional Support

Although the evidence is not abundant, it is significant and scientifically supported that patients with blunt and penetrating abdominal injuries sustain fewer septic complications when fed enterally as opposed to parenterally. The surgeon must be aware of the potential benefits of enteral feedings in these severely injured patients. The trauma surgeon caring for patients with head injury must weigh the benefits and the risks of the route of nutrient administration, as patients with severe head injuries have similar outcomes whether fed enterally or parenterally. As determined in studies of malnutrition and starvation, the hypermetabolic state of the severely injured patient requires that total parenteral nutrition (TPN) should be started by day 7 if enteral feeding is not successful. Equally patients who fail to tolerate at least 50% of their goal rate of enteral feedings by the seventh post-injury day should have total parenteral nutrition instituted, but weaned when greater than 50% of enteral feedings are tolerated.

Level I Recommendations

- Patients with blunt and penetrating abdominal injuries sustain fewer septic complications when fed enterally as opposed to parenterally.
- Patients with severe head injuries have similar outcomes whether fed enterally or parenterally.

Level II Recommendations

- There is insufficient evidence to support Level II recommendations.

Level III Recommendations

- In severely injured patients, total parenteral nutrition should be started by day 7 if enteral feeding is not successful.
- Patients who fail to tolerate at least 50% of their goal rate of enteral feedings by the seventh post-injury day should have total parenteral nutrition instituted, but weaned when greater than 50% of enteral feedings are tolerated.

Early Versus Delayed Feedings

Direct small bowel access is necessary to successfully feed patients via the gastrointestinal tract who have sustained severe blunt and penetrating torso and abdominal injuries as well as severe head injuries. Intragastric feeding at the earliest becomes successful in the majority of head-injured patients at approximately the 3rd to 4th day due to gastroparesis. Small bowel feedings are tolerated in this patient population with small bowel access. In patients with penetrating and blunt injuries to the abdomen who have small bowel access, enteral feeding can be instituted in most patients after resuscitation is complete and hemodynamic stability has been gained. Advancement to goal rate is slower as in patients with higher Abdominal Trauma Index scores, in particular if >40. In addition, gastrointestinal (GI) injury below the site of access may slow advancement of tube feedings but is not a contraindication to direct small bowel feedings. Intragastric feeding in patients with severe burns should be instituted as soon as possible during resuscitation to prevent or minimize the onset of gastroparesis, which appears to occur with increasing incidence if feedings are delayed, particularly if delayed beyond 18 hours. In all patient populations, total parenteral nutrition can be instituted soon after injury, ideally after hemodynamic stability has been gained and resuscitation is complete.

Level I Recommendations

- There is sufficient Level I and II data to support use of early intragastric feedings in burns as soon after admission as possible since delayed enteral feeding (>18 hours) results in a high rate of gastroparesis and need for intravenous nutrition. A high success rate of intragastric feeding occurs when feedings are started within 12 hours of burn.

Level II Recommendations

- Patients with severe head injury who do not tolerate gastric feedings within 48 hours of injury should be switched to post-pyloric feedings, ideally beyond the Ligament of Treitz, if feasible and safe for the patient.

Level III Recommendations

- Patients who are incompletely resuscitated should not have direct small bowel feedings instituted due to the risk of gastrointestinal intolerance and possible intestinal necrosis.
- In patients undergoing laparotomy for blunt and penetrating abdominal injuries, direct small bowel access should be obtained (via nasojejunal feeding tube, gastrojejunal feeding tube or feeding jejunostomy) and enteral feedings begun, if not contraindicated, within 12 to 24 hours of injury.
- Intragastric feeding of patients with severe head injury should be attempted soon after admission unless nasogastric (NG) drainage is excessively high (>300 cc/12 hours)

Standard Versus Enhanced Nutritional Support

A review of the literature regarding enhanced formulations revealed that there is adequate scientific evidence to support the use of enhanced enteral formulations as defined by the addition of omega 3 fatty acids, nucleotides, arginine, beta carotene, and/or glutamine when adequate calorie/protein requirements are met early in the course of treatment of a select group of severely injured patients (injury severity score [ISS] >20, abdominal trauma index [ATI] >25). Similar, though less extensive, literature support exists for septic trauma patients. The improvements were demonstrated in decreased incidence of multisystem organ dysfunction, infection rates, and length of intensive care unit stay but not in overall mortality. No benefit is identified in less severely injured patients.

The authors found no evidence to support the use of enhanced parenteral formulations.

Laboratory evaluation of trace element levels and replacement as indicated seems prudent.

Level I Recommendations

- The use of enhanced enteral nutrition in a select group of severely injured patients (injury severity score >20, abdominal trauma index >25) is beneficial to the trauma patient when given in conjunction with early feeding and adequate protein/calorie support. Level I evidence in nearly each one of the cited studies shows reduced incidence of multisystem organ dysfunction, infectious complications, and overall length of hospital stay. Mortality does not seem to be affected. There is no scientific evidence to support the use of enhanced products in less severely injured patients.
- Literature regarding enhanced formulation in burned patients is not conclusive.

Level II Recommendations

- Administration of an "enhanced" formulation appears to reduce length of stay, septic morbidity and bacteremia in septic trauma patients.

Level III Recommendations

- There is not sufficient evidence to support the use of enhanced formulations of parenteral nutrition products on the basis of this literature review.
- Micronutrients and trace elements should be monitored and replaced as indicated by laboratory data.

Site of Enteral Support: Gastric Versus Jejunal

The need for nutrition following severe injury is intuitively apparent, especially in patients who will not be able to resume oral intake within a few days following injury. Enteral feeding is more physiologic and less expensive than parenteral feeding. Whether it is preferable to feed into the stomach or into the jejunum is not clear, but care must be taken in all patients to ensure that feedings are tolerated, and that aspiration is avoided.

Level I Recommendations

- No recommendations.

Level II Recommendations

- In critically patients, early gastric feeding is feasible, and clinical outcome is equivalent to patients fed into the duodenum. For this reason and because access to the stomach can be obtained more quickly and easily than to the duodenum, an initial attempt at gastric feedings appears warranted.

Level III Recommendations

- No recommendations.

Patients at high risk for pulmonary aspiration due to gastric retention or gastroesophageal reflux should receive enteral feedings into the jejunum. Patients with moderate to severe brain injury demonstrate delayed gastric emptying (gastroparesis) as well as dysfunction of the lower esophageal sphincter. These abnormalities may limit nutritional delivery of calories and protein for the first two weeks following injury. Naso-jejunal feedings provide earlier success attaining nutritional goals compared to intra-gastric feedings, which are limited by high gastric residuals.

Assessment of Energy and Substrate Requirements for the Trauma Patient

Multiple formulae exist that will provide an estimate of an individual patient´s energy and substrate needs. While many of these provide accurate estimates, many do not and can lead to overfeeding with all of its inherent complications. It is best to remember that these formulae provide at best only an estimate of an individual patient´s initial energy and substrate needs, and that these

requirements will vary throughout the course of illness and recovery. Ongoing assessment of the appropriateness of nutritional support is crucial in avoiding under- and over-feeding.

Level 1 Recommendations

- There appears to be NO advantage to the routine use of calorimetry to determine the caloric requirements of burn patients.

Level II Recommendations

- For moderate to severe trauma injury patients (Injury Severity Score [ISS] range 25-30), energy requirements are estimated to be 25 to 30 total kcal/kg/day or 120% to 140% of predicted basal energy expenditure [BEE] (per Harris-Benedict equation).
- There appears to be no consistent relationship between injury severity score (ISS) and measured resting energy expenditure (MREE) in trauma patients.
- For severe head-injury patients (Glasgow Coma Scale [GCS] <8), energy requirements may be met by replacing 140% of measured resting energy expenditure (approximately 30 total kcal/kg/day) in non-pharmacologically paralyzed patients and 100% of measured resting energy expenditure (approximately 25 kcal/kg/day) in paralyzed patients.
- Within the first two weeks after spinal cord injury, nutritional support should be delivered at 20 to 22 total kcal/kg/day (55% to 90% of predicted basal energy expenditure by Harris-Benedict equation) for quadriplegics and 22 to 24 total kcal/kg/day (80% to 90% of predicted basal energy expenditure by Harris-Benedict equation) for paraplegics.
- For patients with burns exceeding 20% to 30% total body surface area (TBSA), initial caloric requirements may be estimated by any of several available formulas.
- The Curreri Formula (25 kcal/kg + 40 kcal/total body surface area burn) overestimates caloric needs of the burn patient (as estimated by calorimetry) by 25% to 50%.
- The Harris-Benedict Formula underestimates the caloric needs of the burn patient (as estimated by calorimetry) by 25% to 50%.
- In patients with burns exceeding 50% total body surface area, total parenteral nutrition (TPN) supplementation of enteral feedings in order to achieve Curreri-predicted caloric requirements is associated with higher mortality and aberrations in T-cell function.
- Caloric requirements for major burns fluctuate throughout the hospital course, but appear to follow a biphasic course with energy expenditure declining as the burn wound closes. Therefore, direct measurement of energy expenditure via calorimetry on a once or twice weekly basis may be of benefit in adjusting caloric support throughout the hospital course.
- Intra-operative enteral feeding of the burn patient is safe and efficacious, leads to fewer interruptions in the enteral feeding regimen, and therefore more successful attainment of calorie and protein goals.
- Approximately 1.25 grams of protein per kg body weight is appropriate for most traumatized patients.
- Up to 2 grams of protein per kg body weight per day is appropriate for severely burned patients.

- In the burn patient, energy as carbohydrate may be provided at a rate of up to 5 mg/kg/min (approximately 25 kcal/kg/day); exceeding this limit may predispose patients to the metabolic complications associated with overfeeding. In the non-burn trauma patient, even this rate of carbohydrate delivery may be excessive.
- Intravenous lipid or fat intake should be carefully monitored and maintained at <30 percent of total calories. Zero fat or minimal fat administration to burned or traumatically injured patients during the acute phase of injury may minimize the susceptibility to infection and decrease length of stay.
- Proteins, fat and carbohydrate requirements do not appear to vary significantly according to the route of administration, either enterally or parenterally.
- Fat or carbohydrate requirements do not appear to vary significantly according to the type of injury, i.e., burned versus traumatically injured.

Level III Recommendations

- Provision of excess calories to trauma patients may induce hyperglycemia, excess CO_2 production, fluid/electrolyte abnormalities, lipogenesis, and hepatic steatosis.
- Energy requirements for patients with less than 20% to 30% total body surface area burns are similar to those of patients without cutaneous burns.
- Protein requirements in burn patients and in those with severe central nervous system (CNS) injuries may be significantly greater than anticipated, up to 2.2 grams/kg body weight per day. However, the ability to achieve positive nitrogen balance in a given patient varies according to the phase of injury. Provision of large protein loads to elderly patients, or to those with compromised hepatic, renal or pulmonary function may lead to deleterious outcomes.

Nutrition Monitoring

Patients receiving nutritional support should be closely monitored. Current data however does not address the frequency of monitoring or the efficacy of monitoring.

Level I Recommendations

- No recommendations.

Level II Recommendations

- Compared to other visceral proteins, serial determination of serum pre-albumin is the most sensitive indicator of appropriate nutritional support.

Level III Recommendations

- Patients receiving nutritional support should be weighed regularly, and accurate measurements made of intravenous volume infused, oral intake and urinary output.

- Prior to the initiation of nutritional support baseline levels of the following should be obtained: blood urea nitrogen (BUN), creatinine, plasma electrolytes, glucose, calcium, magnesium, inorganic phosphorus, total protein, albumin, pre-albumin, hemoglobin, white blood cell count (WBC), platelet count, triglycerides, transaminases.
- Patients must have an assessment of their nutritional needs. This assessment should be based on the patient´s history, physical examination, laboratory values and the patient´s disease process. Caloric and protein requirements should be based the overall assessment. Adjuncts such as, the Harris-Benedict Equation (HBE), indirect calorimetry, nitrogen balance calculation, and the creatinine height index (CHI) should also be used to estimate caloric and protein requirements.
- After the initiation of nutritional support, the following should be monitored daily until levels are stable: plasma electrolytes, glucose and magnesium. Blood urea nitrogen, creatinine, calcium, inorganic phosphorus and, for patients receiving total parenteral nutrition, transaminase and triglyceride levels should be monitored 2 to 3 times per week until levels are stable. Total protein, albumin and pre-albumin should be monitored weekly until the levels are stable. Continued monitoring of these laboratory values should be dictated by the patient´s clinical course.
- A reassessment of the patient´s nutritional needs e.g. nitrogen balance and indirect calorimetry measurements, should be done weekly until the patient has reached a steady state.

Definitions:

Recommendation Scheme:

Level I: The recommendation is convincingly justifiable based on the available scientific information alone. This recommendation is usually based on Class I data, however, strong Class II evidence may form the basis for a Level I recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low quality or contradictory Class I data may not be able to support a Level I recommendation.

Level II: The recommendation is reasonably justifiable by available scientific evidence and strongly supported by expert opinion. This recommendation is usually supported by Class II data or a preponderance of Class III evidence.

Level III: The recommendation is supported by available data but adequate scientific evidence is lacking. This recommendation is generally supported by Class III data. This type of recommendation is useful for educational purposes and in guiding future clinical research.

Classification Scheme:

Class I: Prospective randomized studies

Class II: Prospective, non-comparative studies; retrospective series with controls

Class III: Retrospective analyses (case series, databases or registries, case reviews)

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Conclusions were based on evidence obtained from prospective randomized studies (Class I); prospective, non-comparative studies; retrospective series with controls (Class II); or retrospective analyses (case series, databases or registries, case reviews (Class III).

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

Route of Nutritional Support

The evidentiary tables included fourteen Class I references, ten Class II references, and three Class III references.

Early Versus Delayed Feedings

The evidentiary tables included thirteen Class I references, eight Class II references, and two Class III references.

Standard Versus Enhanced Nutritional Support

The evidentiary tables included nineteen Class I references, three Class II references, and one Class III reference.

Site of Enteral Support: Gastric Versus Jejunal

The evidentiary tables included one Class I reference, five Class II references, and fourteen Class III references.

Assessment of Energy and Substrate Requirements for the Trauma Patient

The evidentiary tables included nineteen Class I references, forty-five Class II references, and thirty Class III references.

Nutrition Monitoring

The evidentiary tables included one Class I reference, fifteen Class II references, and twenty-two Class III references.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Laboratory and clinical studies reveal beneficial effects of early nutrition on the gut mucosa, immunological integrity, survival of septic peritonitis, pneumonia and abscess formation.

POTENTIAL HARMS

- In patients with blunt and penetrating abdominal injuries, septic complications can arise from parenteral nutrition, including pneumonia, intra-abdominal sepsis, and line sepsis.
- One potential disadvantage regarding the enteral approach to nutrition in the trauma patient is the concern that adequate amounts of protein and calories cannot be delivered via this route, due to frequent interruptions in feeding necessitated by multiple operative procedures.
- Intragastric and intraduodenal feedings in patients with burns has resulted in episodes of distension, reflux, or diarrhea.
- Pulmonary aspiration due to gastric retention or gastroesophageal reflux is a potential complication of direct intragastric feedings.
- Use of mathematical formulas to predict caloric needs of trauma patients can lead to under- or overfeeding, both of which can have deleterious effects on the patient.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

The guideline developers make the following recommendations regarding implementation:

Implementation involves extensive education and inservicing of nursing, resident, and attending staff members and has one important guiding principle: the guidelines must be available to the clinicians in real time while they are actually seeing the patient. The two most common ways to apply these are by using either a critical pathway or a clinical management protocol. A critical pathway is a calendar of expected events that has been found to be very useful within designated diagnosis-related groups. In trauma, where there are multiple diagnosis-related groups used for one patient, pathways have not been found to be easily applied with the exception of isolated injuries. Clinical management protocols, on the other hand, are annotated algorithms that answer the "if, then" decision making problems and have been found to be easily applied to problem-, process-, or disease-related topics. The clinical management protocol consists of an introduction, an annotated algorithm and a reference page. The algorithm is a series of "if, then" decision making processes. There is a defined entry point followed by a clinical judgment and/or assessment, followed by actions, which are then followed by outcomes and/or endpoints. The advantages of algorithms are that they convey the scope of the guideline, while at the same time organize the decision making process in a user-friendly fashion. The algorithms themselves are systems of classification and identification that should summarize the

recommendations contained within a guideline. It is felt that in the trauma and critical care setting, clinical management protocols may be more easily applied than critical pathways, however, either is acceptable provided that the formulated guidelines are followed. After appropriate inservicing, a pretest of the planned guideline should be performed on a limited patient population in the clinical setting. This will serve to identify potential pitfalls. The pretest should include written documentation of experiences with the protocol, observation, and suggestions. Additionally, the guidelines will be forwarded to the chairpersons of the multi-institutional trials committees of the Eastern Association for the Surgery of Trauma, the Western Association for the Surgery of Trauma, and the American Association for the Surgery of Trauma. Appropriate guidelines can then be potentially selected for multi-institutional study. This process will facilitate the development of user friendly pathways or protocols as well as evaluation of the particular guidelines in an outcome based fashion.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

EAST Practice Management Guidelines Work Group. Practice management guidelines for nutritional support of the trauma patient. Allentown (PA): Eastern Association for the Surgery of Trauma (EAST); 2001. 112 p. [93 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2001

GUIDELINE DEVELOPER(S)

Eastern Association for the Surgery of Trauma - Professional Association

SOURCE(S) OF FUNDING

Eastern Association for the Surgery of Trauma (EAST)

GUIDELINE COMMITTEE

EAST Practice Management Guidelines Work Group

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Work Group Members: Danny O. Jacobs, MD; Kenneth A. Kudsk, MD; Michael F. Oswanski, MD; Gordon S. Sacks, PharmD, L.R. "Tres" Scherer, III, MD; Karlene E. Sinclair, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

GUIDELINE AVAILABILITY

Electronic copies: Available (in Portable Document Format [PDF] from the Eastern Association for the Surgery of Trauma (EAST) Web site.

Print copies: Available from the EAST Guidelines, c/o Fred Luchette, MD, Loyola University Medical Center, Department of Surgery Bldg. 110-3276, 2160 S. First Avenue, Maywood, IL 60153; Phone: (708) 327-2680; E-mail: fluchet@lumc.edu.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Practice management guidelines for trauma: East Ad Hoc Committee on Guideline Development (Unabridged: Revised 1998 Mar 20). Available from the Eastern Association for the Surgery of Trauma (EAST) Web site.

An excerpt is also available:

- Pasquale M, Fabian TC. Practice management guidelines for trauma from the Eastern Association for the Surgery of Trauma. J Trauma 1998 Jun;44(6):941-56; discussion 956-7.

Also available:

- Utilizing evidence based outcome measures to develop practice management guidelines: a primer. Allentown (PA): Eastern Association for the Surgery of Trauma; 2000. 18 p. Available from the EAST Web site.

Print copies: Available from the EAST Guidelines, c/o Fred Luchette, MD, Loyola University Medical Center, Department of Surgery Bldg. 110-3276, 2160 S. First Avenue, Maywood, IL 60153; Phone: (708) 327-2680; E-mail: fluchet@lumc.edu.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on February 27, 2002. The information was verified by the guideline developer as of March 26, 2002.

COPYRIGHT STATEMENT

Date Modified: 11/8/2004